

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Service Rules for the 698-746, 747-762	)	WT Docket No. 06-150
and 777–792 MHz. Bands	)	
	)	
Implementing a Nationwide, Broadband,	)	PS Docket No. 06-229
Interoperable Public Safety Network in	)	
the 700 MHz. Band	)	
	)	
Amendment of Part 90 of the	)	WP Docket No. 07-100
Commission’s Rules	)	

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**REPLY COMMENTS OF THE NEW YORK CITY POLICE DEPARTMENT**

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**REPLY COMMENTS OF THE NEW YORK CITY POLICE DEPARTMENT**

**I INTRODUCTION**

1. The New York City Police Department respectfully submits these Reply Comments in response to the Commission’s Third Report and Order and Fourth Further Notice of Proposed Rulemaking regarding the proposed implementation of a Nationwide Broadband Interoperable Public Safety Network in the 700 MHz. band. The New York City Police Department appreciates the Commission affording us this opportunity to express our views regarding this critical and timely issue.

2. The New York City Police Department is the Nation’s largest police agency with plenary law enforcement responsibility within the five Boroughs of the City of New York. The New York City Police Department receives approximately eleven million E-911 calls annually, and patrols an area of approximately 306 square miles, including some of the most densely populated geography in the Nation.

3. As commercial wireless network operators offer broadband wireless services to the public and additional broadband applications are developed and deployed commercially, variants of these applications will inevitably be adapted by public safety agencies in an effort to improve efficiency and provide better service. Ultimately, public safety will come to rely upon many of these applications and some of them will achieve mission critical status in the same way that voice is viewed as mission critical to public safety today. For this reason, public safety seeks to build their own broadband network in order to insure broadband wireless access during high traffic periods and to ensure that the network infrastructure meets public safety standards for reliability and availability. The public safety broadband wireless network (PSBN) will provide native interoperability to public safety entities for the first time. The successful deployment the 700 MHz. PSBN is a critical element in solving the current interoperability dilemma, by adapting a common wireless technology platform, utilizing a common frequency band and requiring the use of compatible applications.

## **II EXECUTIVE SUMMARY**

4. The NYPD believes that a regional approach is the correct one. Regional, Tribal, State and local public safety officials must be active participants in designing, deploying, and managing the PSBN. Since the vast majority of public safety incidents are local in nature and scope, regional and local public safety agencies must be afforded maximum flexibility in managing their respective 700MHz. broadband wireless networks. Regional network builders should be granted flexibility in designing and deploying their broadband wireless networks, since they will be the networks primary users, and are the incumbent subject matter experts regarding local requirements.

5. The New York City Police Department believes that voice capability will become a critical component of the nationwide public safety wireless broadband network and may choose to pilot a PTT voice application. We should be free to do so without seeking the approval of a national organization that may have a different perspective. In these Reply Comments we have assumed a “network of networks” model in addressing many of the issues presented for comment in the Third Report and Order and the Fourth Further Notice of Proposed Rulemaking.

6. In summary, the NYPD supports the following concept in the establishment of the 700MHz. public safety broadband wireless network.

- A regional “network of networks” approach.
- Local or Regional management and control of the network, including the implementation of optional applications;
- The use of a third party clearinghouse to facilitate authentication and roaming.
- Voice capability as a network requirement as soon as technically feasible.

- Propagation requirements supporting indoor coverage on a sliding scale based upon geography, population density and building construction.
- Authorization for Federal and critical infrastructure users to utilize the network in order to improve public safety response and mitigate network costs.
- The use of certified testing labs to ensure compatibility and interoperability.
- Deployable assets such as COWs and COLTs as a mechanism to mitigate network outages and supplement capacity during extreme events.
- The future deployment of femto cells and LTE network relays to enhance and extend coverage, when they become commercially available and are supported by LTE standards.

7. Although we have responded to many of the technical issues posed by the Commission, we are not convinced that codifying detailed technical requirements is necessarily the best approach at this time, since LTE technology is new and evolving and Commission rules and regulations require an extended time to adapt or to change. However, we are reluctant to endorse the assignment of the technical decision making process to a national entity that has yet to be identified and may not represent our interests.

### **III. DISCUSSION: THIRD REPORT AND ORDER THIRD REPORT AND ORDER A Common Technology Platform for the Nationwide Public Safety Broadband Network**

8. We commend the Commission in selecting LTE, specifically at least 3GPP Standard E-UTRA Release 8 and associated EPC as the common technology platform for the nationwide public safety broadband network (PSBN). The migration of public safety communications to a single frequency band and a common wireless technology over time, are key elements in

providing native interoperability between public safety agencies nationwide. The selection of LTE technology by the FCC and public safety is a first step in achieving this goal. Since most commercial wireless networks also intend to deploy LTE networks, public safety device costs likely will decrease. In addition, public safety will benefit from ongoing research and development largely funded by commercial interests. As new releases of 3GPP LTE standards are completed, additional features and options will become available to public safety network operators enabling the public safety wireless ecosystem to evolve in harmony with its commercial counterpart.

## **B. Enabling Public Safety Interoperability**

9. Interoperability has been elusive since the early days of public safety radio largely due to the assignment of disparate frequency bands and the use of proprietary technology. Although APCO has strived to resolve some of these issues, the fact remains that many public safety agencies still lack the ability to communicate with each other directly. One of the primary benefits of the public safety broadband wireless network will be inherent interoperability designed into the network from the outset. The Commission's action in mandating LTE as a common wireless technology platform for public safety broadband networks is a solid first step in addressing the public safety interoperability dilemma.



#### **IV. DISCUSSION: FOURTH FURTHER NOTICE OF PROPOSED RULEMAKING**

10. The NYPD concurs with the Commission's intention to broaden their definition of interoperability in Part 90 to conform to the DHS definition. Harmonization of terms across Federal, Tribal, State and local jurisdictions advances our shared goal of public safety wireless communications interoperability.

##### **A. Technical Rules for the Public Safety Broadband Network**

###### **Architectural Framework**

11. We acknowledge that there are no perfect solutions to many of the technical issues raised by the Commission in the Fourth Further Notice and we understand that technical decisions made early on will have long term implications. As an initial matter, we suggest that the public safety network closely mirror nationwide commercial LTE networks, deviating from nationwide commercial LTE network designs only when the interests of public safety cannot otherwise be met. We caution that creating a public safety LTE network markedly different from commercial LTE networks will defeat much of the Commission's purpose; to establish a standards based broadband public safety network in tune with current technology that can grow in harmony with commercial technology.

###### **Architectural Guiding Principles**

12. We concur with the Commission that Long Term Evolution (LTE) is the correct technology choice for the Public Safety Nationwide Broadband Network, specifically 3GPP Standard E-UTRA; Release 8 and associated Evolved Packet Core (EPC). We applaud the Commission in establishing a common technology platform that will unify public safety

broadband wireless communications systems under a global standards umbrella. LTE is the overwhelming broadband technology of choice in the 700 MHz. band and is the appropriate technology choice for public safety. The Commission's historic decision is an important first step to resolving lingering interoperability problems.

13. We continue to advocate a "network of networks" design rather than a single nationwide network design. Although we acknowledge that from a technical point of view a single network would be less problematic, we contend that the vast majority of public safety incidents are local in nature and that local control of the network remains a primary objective. We concur with the Comments filed by Motorola Solutions Inc. (MSI) on this issue.

*"While various models for governance of the nationwide Public Safety Broadband Network ("PSBN") with varying levels of national control and coordination are conceivable, MSI believes that consideration must be given to how quickly such a structure or entity could be established and functional, so as not to delay broadband deployment. Whatever governing body is ultimately chosen, MSI believes it critical that it is responsive and representative of the ultimate end users of the network and their operational requirements. State and local officials are better positioned than national officials to determine what applications or quality of services is best for them, because of their greater operational experience in managing sophisticated communications networks."*<sup>1</sup>

We also support the Reply Comments filed by the Adams County Communications Center (ADCOM 911).<sup>2</sup>

*"ADCOM 911 fully supports the concept of a network of networks approach integrating multiple regional LTE networks together. We feel this approach offers the greatest flexibility, redundancy and achieves all the required goals of a nationwide network while maintaining local and regional control and implementation that is critical to the successful buy –in of local agencies throughout the country."*

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<sup>1</sup> See Comments of MSI filed in response to the *Fourth Further Notice of Proposed Rulemaking*; Introduction

<sup>2</sup> See Reply Comments of Adams County Communications Center, page 2; *II. Comments/Responses*.

14. We concur with the Commission's opinion as expressed in the *Third Further Notice of Proposed Rulemaking*, that "As the LTE standard progresses the network must become capable of supporting both mission critical voice and data communications. Support of both is necessary to ensure a baseline level of operability and interoperability across the country."<sup>3</sup> As the Commission is aware, the NYPD is an advocate of mission critical voice as a future goal of the Public Safety Broadband wireless network. We believe that the sooner this goal can be achieved, the sooner public safety will enjoy true nationwide interoperability benefiting from commercial research and development while ending public safety's reliance on costly proprietary public safety communications infrastructure equipment and subscriber devices that lack native interoperability.

15. Public Safety would be served best by migrating over time to a single radio network on a single frequency band using a common air interface providing native interoperability without relying on external devices. Consolidating public safety communications onto a contiguous spectrum of sufficient bandwidth and adapting a global standard air interface are key elements to controlling future costs and ensuring native interoperability.

16. The NYPD supports the tentative conclusion of the Commission to endorse the concept of a third party Clearinghouse to support roaming, authentication and internetworking functions. This concept is in accordance with the *NPSTC 700 Public Safety Broadband Taskforce Report and Recommendations*.<sup>4,5</sup> We believe that a single clearinghouse would be sufficient as an initial

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<sup>3</sup> See *Fourth Further Notice of Proposed Rulemaking*, ¶ 20 "Supporting Voice and Data Communications"

<sup>4</sup> See NPSTC 700 MHz. Public Safety Broadband Task Force Report and Recommendations dated September 4, 2009; section 6.1.4 (page 12) and section 13.3.6 (page 61)

<sup>5</sup> See *Fourth Further Notice of Proposed Rulemaking* ¶ 21.

requirement to facilitate roaming. If internetwork billing is adapted as a policy, the clearinghouse could also perform this function. We note that commercial wireless networks traditionally utilize third party clearinghouses for roaming authentication, to facilitate internetworking and to provide internetwork billing services. We believe that regional public safety broadband networks would realize similar benefits by adapting this commercial model.

17. Keeping current with commercial technological advances is critical to the long term survivability of the network and ensures against premature network obsolescence. We concur with the Commission that future releases of LTE standards will support mission critical voice<sup>6</sup> and that compatibility with earlier versions of LTE is required. We concur that sharing network cores and other infrastructure components should be encouraged in an effort to reduce network deployment costs.

18. We concur that the Commission should adapt a framework for the network architectural vision. However, we do not believe that detailed technical parameters should be codified at this time, since the pace of recent technological advances in the telecommunications industry exceeds the normal pace of regulatory change. As suggested in the *Fourth Further Notice*, this task could be a role for the Emergency Response Interoperability Center Public Safety Advisory Committee, however they would likely need the support of the ERIC Technical Advisory Committee or another group of wireless telecommunications subject matter experts. Alternatively, the Commission, Congress or the Administration could create a new National Governance Entity specifically for this purpose, composed of public safety stakeholders supported by industry technical experts. We suggest that the public safety stakeholders be the

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<sup>6</sup> See Fourth Further Notice of Proposed Rulemaking ¶ 20.

decision makers and the industry experts serve as technical advisors. Furthermore, those assigned to this role must be willing and able to make informed technical decisions in a timely fashion.

### **Open Standards**

19. The NYPD supports open standards as a means to encourage competition and control network costs. Proprietary solutions should be discouraged as they are an impediment to nationwide interoperability, keep costs high and inhibit competition. Accordingly, they should only be permitted in cases where they provide a capability not provided for within the LTE standards.<sup>7</sup>

### **Technology Platform and System Interfaces**

20. Regarding future upgrades, we concur that the Commission should adapt rules to ensure that public safety networks upgrade their networks to incorporate newer releases of LTE on a timely basis<sup>8</sup>. In particular, we are in favor of features under development for Release 9 and Release 10 that will enable real time voice and video communications, and multicasting / broadcasting voice and video.

21. The NYPD is an advocate for voice applications to be supported by the public safety broadband network; specifically non mission critical voice communications in the short term and mission critical voice communications in the long term. We note that both the *Third Further Notice of Proposed Rulemaking* and The *NPSTC Statement Of Requirements* specify non mission

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<sup>7</sup> See Letter from Chairman Genachowski to the Honorable Henry A. Waxman, July 20, 2010; Question 2.

<sup>8</sup> See *Fourth Further Notice of Proposed Rulemaking* Paragraph 29.

critical PTT voice as a requirement of the Public Safety Broadband Wireless Network.<sup>9,10</sup> We also note that the NPSTC 700MHz. *Broadband Task Force Report and Recommendations* lists LMR voice gateways as required, and LMR and PSTN voice as desired.<sup>11</sup> We further note that both the *National Broadband Plan* and the *Fourth Further Notice of Proposed Rulemaking* call for the public safety nationwide broadband network to support mission critical voice when LTE standards support this feature.<sup>12,13</sup>

## **System Identifiers**

22. The NYPD continues to advocate a “network of networks” design for the Public Safety Broadband Network as described in the 4FNPRM. Although a single nationwide network would resolve some technical issues, we continue to prefer a “network of networks” design since we believe that one size does not fit all, and that the vast majority of public safety incidents are local or regional in nature. Furthermore, network requirements differ with geography and population density. We concur with Motorola, Alcatel-Lucent, D.C. and Adams County Communications Center (ADCOM 911) that in a “network of networks” design utilizing a single system identifier scheme is a viable technical solution<sup>14</sup>. Accordingly, the NYPD supports a hybrid PLMN ID plan consisting of one nationwide PLMN ID and PLMN IDs for each regional network.

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<sup>9</sup> See *Third Further Notice of Proposed Rulemaking* Appendix C, Proposed Rules page 167 (4); page 170(table 1)

<sup>10</sup> See *NPSTC Statement Of Requirements* Version 0.6, Section 3.2 Requirement 5

<sup>11</sup> See *NPSTC 700 MHz Public Safety Broadband Task Force Report and Recommendation*, Sections 6.2.10 , 6.2.11

<sup>12</sup> See *National Broadband Plan* “As the LTE standard progresses the network must become capable of supporting both mission critical voice and data communications”

<sup>13</sup> See *Fourth Further Notice of Proposed Rulemaking*; ¶20 and 24.

<sup>14</sup> See Alcatel- Lucent comments on *Technical Public Notice* at 7-8(July 19, 2010); District of Columbia Comments on *Technical Public Notice* at 7 (July 16, 2010); Motorola Comments on *Technical Public Notice* at 7 (July 19, 2010); Adams County Communications Center (ADCOM911) Reply Comments; Page 2, *II. Comments/Responses*

### **Roaming Configurations**

23. Regarding roaming issues presented in Paragraph 35, 36 and 37 of the Fourth Further Notice of Proposed Rulemaking, we concur with the Commission's tentative conclusion that the Public Safety Broadband network should support both local breakout roaming and home- routed roaming.

### **Roaming Authentication and Internetworking Functions**

24. We support the use of third party clearing houses to facilitate authentication and managing roaming in visited networks. Our preference would be for a single third party clearing house.

### **Interconnectivity of Regional or Tribal Broadband Networks**

25. Direct Interconnectivity is the most robust but also the most costly option. As noted in the Fourth Further Notice of Proposed Rulemaking, the number of high speed links increases rapidly with the number of nodes and particularly with the number of networks interconnected<sup>15</sup>. We concur with the Commission's tentative conclusion that this option is cost prohibitive. We believe that the second option presented in the Fourth Further Notice of Proposed Rulemaking, the use of the public internet as an interconnection hub for network connectivity, is unacceptable as the primary method of interconnection but could potentially serve as a backup, should the primary method fail. The third interconnectivity option presented by the Commission, the use of a third party clearinghouse as recommended by NPSTC<sup>16</sup> is the most appropriate for the nationwide public safety broadband network. Wherever possible, different technologies should

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<sup>15</sup> See Fourth Further Notice of Proposed Rulemaking; ¶ 39.

<sup>16</sup>See NPSTC 700MHz. BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; Section 6.1.4 Common Clearinghouse;

be utilized to provide the redundant links (e.g. microwave and fiber). The public internet should only be used to interconnect nodes as a method of last resort.

### **Mobility and Handover**

26. We concur with the Commission's tentative conclusion that each operator's network must support seamless handover within its coverage area. We support the contention that each network operator should support both the X2 and S1 methods of handover to facilitate mobility between public safety LTE networks and commercial networks that deploy disparate Radio Access Technologies (RAT) such as CDMA. We believe that LTE networks that support both the X2 and S1 interfaces will enable users to maintain data session continuity while traversing disparate radio access technologies. In addition, we support a requirement for the nationwide public safety broadband network to maintain data session connectivity at mobility speeds of 100mph, at reduced throughput as per LTE specifications.

### **Out of Band Emissions and Related Requirements**

27. We concur with the Commission's tentative conclusion regarding out of band emissions; specifically that for operations in the 763 – 768 MHz. band and the 793-798 MHz. band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the (P) within the licensed band(s) of operation, measured in Watts, in accordance with the following:

- On any frequency outside the 763-768 MHz. band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43+10 \log(P)$  dB; and



- On any frequency outside the 763-768 MHz. band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43+10 \log(P)$  dB.

## Applications

28. We support the applications listed in the NPSTC 700 MHz. Public Safety Broadband Task Force Report and Recommendations (Final) as “required applications”, specifically

1. Internet Access<sup>17</sup>,
2. VPN Access<sup>18</sup>,
3. Status/Information Homepage<sup>19</sup>,
4. Status Information “SMS/MMS Messaging”<sup>20</sup>
5. Access to Responders under Incident Command System (ICS)<sup>21</sup>

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<sup>17</sup> See NPSTC BBTF Final Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; Section 6.2.1; “6.2.1 Internet Access –Required Public safety subscribers shall have access to the global Internet. Users will use the Internet both as a way to access home network systems and to access other systems and services available over the public Internet, including but not limited to messaging systems and web servers.”

<sup>18</sup> See NPSTC 700MHz. BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; Section 6.2.2; “6.2.2 VPN Access to any Authorized Site and to Home Networks - Required The regional operator and commercial networks operating in conjunction with the PSBL shall be required to allow establishment and use of VPN connections by roaming users on their networks to other networks.”

<sup>19</sup> See NPSTC 700MHz.BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; “Section 6.2.3 Status/Information “Homepage” - Required Public safety or public/private partnership network operators shall provide a universal method to obtain a “home page” for visitors to the system. This “home page” will facilitate access to and distribution of available applications, alerts, incident-specific information, system status information, and information that the operator deems important to share with visitors to the system.”

<sup>20</sup> See NPSTC 700MHz. BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; “Section 6.2.4 Status/Information “SMS-MMS Messaging” - Required Public safety, public/private partnership, and commercial network operators shall provide the ability for users to send and receive Short Message Service (SMS) and Multimedia Messaging Service (MMS) messages”.

<sup>21</sup> See NPSTC 700MHz BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; “Section 6.2.5 Access to Responders under Incident Command System (ICS) – Required First responders, emergency response support, and all other mutual aid responders managed under the ICS structure of a requesting agency served by a public safety broadband network shall be provided access to that network to carry out incident objectives and communicate with their home networks.”

## 6. LMR Gateway Devices<sup>22</sup>

29. In addition, we support the following two applications as future requirements to be implemented when appropriate handsets are available and have passed device testing. We note that both of these requirements are listed in the NPSTC Task Force Report as desired, but of these applications are listed in the NPSTC Statement of Requirements and the Third Further Notice Of Proposed Rulemaking as required.

1. LMR (PTT) Voice<sup>23,24,25</sup>,
2. PSTN Voice<sup>26,27,28</sup>

30. We suggest that once voice capable LTE handsets become available and pass device testing, the Commission add, *Push to Talk (PTT) voice* and *PSTN interconnected voice*, to the list of required applications'. Although these applications are only listed as “desired” in the NPSTC 700 MHz. Public Safety Broadband Task Force Report and Recommendations<sup>28,29</sup> they are listed

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<sup>22</sup> See NPSTC 700MHz. BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; “Section 6.2.6 LMR Gateway Devices – Required Networks shall allow for connection and operation of IP-based voice interoperability gateways.”

<sup>23</sup> See NPSTC 700 MHz BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; 6.2.10 LMR Voice – Desired “Networks that provide voice service as an application should provide voice interoperability interfaces to existing agency LMR systems in the area served by the broadband network. Public Safety users on such home or visited networks should be able to call or hail an authoritative dispatch agency or control point using the broadband network subscriber device with microphone and speaker for two-way audio and talk or be connected to other serving agency voice communications resources. Because the devices and device capabilities for this feature will develop over time, this feature may be considered a future requirement.”

<sup>24</sup> See NPSTC Statement of Requirements Page 20 Section 3.2 Requirement 5; “Push to talk voice, typically commercial grade push to talk voice, not intended as a replacement for land mobile radio”

<sup>25</sup> See NPSTC 700 MHz BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp>; See Third Further Notice of Proposed Rulemaking Appendix C, Proposed Rules page 189 (4); page 193 (table 1)

<sup>26</sup> See NPSTC Statement of Requirements Section 2.6 Requirement 3 “The network shall support an interface to the Public Switched Telephone Network”

<sup>27</sup> See Third Further Notice of Proposed Rulemaking Appendix C, Proposed Rules page 189 (4)

<sup>28</sup> See NPSTC 700 Mhz. BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp> Section 6.2.10; LMR Voice- Desired

as “required” in both the NPSTC *Statement of Requirements*<sup>30</sup> and in the *Third Further Notice of Proposed Rulemaking*<sup>31</sup>. Finally, when LTE standards sufficiently mature, we suggest that mission critical voice be added as a required application as envisioned in the National Broadband Plan<sup>32</sup>.

### **Interconnection with Legacy Public Safety Networks**

31. The NYPD supports LMR gateways as a means to provide critical voice functionality at the scene of major incidents where the lack of compatible LMR subscriber units often thwarts interoperability. Once the necessary interfaces are complete and appropriate handsets have passed device testing, the Commission should add LMR gateways to the list of required applications as previously stated. Until such time, regional network operators should be afforded the flexibility of deploying pilot LMR gateways at their discretion. We note that the New York State Division of Homeland Security and Emergency Services alludes to the desirability of PTT capability and interconnection with existing Legacy Public Safety Networks in their recently filed comments.<sup>33</sup>

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<sup>29</sup> See NPSTC 700 Mhz. BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp> Section 6.2.11; PSTN Voice- Desired

<sup>30</sup> See NPSTC *Statement of Requirements Version 0.6*; Section 3.2 Requirement 5

<sup>31</sup> See *Third Further Notice of Proposed Rulemaking Appendix C, Proposed Rules* page 189 (4); page 193(table 1)

<sup>32</sup> See *Fourth Further Notice* ¶24 “The evolution of technology and standards should provide support for voice and mission critical voice and ensure that the public safety network and its operation evolve and keep pace with the competitive commercial marketplace. Further, backwards compatibility is essential if the network is to be fully interoperable across the nation.”

<sup>33</sup> See *Comments of New York State Division of Homeland Security and Emergency Services*; Page 1 “In order to best interface with existing push to talk (“PTT”) radio systems, Ideally, the broadband device would contain an interface that is compatible with both analog (voice/PTT) and P25 digital (analog voice as well as ISSI systems.) By creating broadband devices with interfaces that are fully compatible with existing public safety equipment, users are not required to replace inventories of interoperable devices or overcome limitations with prior era radios. These types of devices should be available on both an infrastructure level as well as a mobile / portable format for tactical field deployment”

## **Performance**

32. We concur that it is appropriate to adapt baseline performance standards, however performance standards adapted by the Commission should be minimum required standards, particularly in the early stages of network deployment, allowing regional network operators to exceed the standards as the network matures and technology evolves.

## **Network Capacity**

33. Backhaul capacity limitations should not constrain throughput on the PSBN. If spectrum is truly the scarcest and most valuable network asset, backhaul capacity should not be allowed to impede network performance, rather it should be capable of transporting all the data that the radio channel can deliver with minimal latency. Excess capacity within the backhaul network creates additional opportunities to gather data; for example each RAN site or network node can become a 4.9GHz. hotspot, or host fixed video surveillance cameras without impacting 700MHz. spectral capacity.

## **Security and Encryption**

34. The NYPD concurs with the Commission's decision to require the adaption of LTE as the technology standard for broadband public safety networks deployed on the 700 MHz. band as it is the dominant commercial standard and has been endorsed by numerous Public Safety agencies and nationwide associations. In addition, the NYPD concurs with the NPSTC Broadband Task Force (BBTF) recommendations requiring the implementation of the following optional security

features within the LTE standards<sup>34</sup> Radio Resource Control (RRC) protocol layer to implement LTE signaling layer security features

- Network Access Stratum (NAS) protocol layer to implement EPC signaling layer features
- Packet Data Convergence sub-layer Protocol (PDCP) to implement user data plane security features.

Since the above security features only address security issues over the radio interface, and since the Evolved Packet Core (EPC) utilizes IP, additional security features will be required to provide true end to end security.

### **Robustness and Hardening**

35. A minimum of twenty four hours of battery backup emergency power should be required for every network node. Longer term (72 hour minimum) backup power capability should be required at critical network nodes. The network operator should be afforded the flexibility to fulfill the long term power backup power requirement by implementing a variety of technologies, including generators, solar panels or additional batteries in any combination. The network operator should be required to certify that the backup power requirements have been met within six months of commencing network operations. The network operator should test the emergency power capability every six months thereafter and maintain a log recording the results of these tests.

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<sup>34</sup> See NPSTC 700 MHz. BBTF Report available at <http://www.npstc.org/broadbandTaskForce700.jsp> Appendix F, Section 13.3. 10; LTE Security “The Radio Resource Control (RRC- TS 36.311 protocol layer may optionally implement LTE signaling layer security features. The Network Access Stratum (NAS – TS 24.301) protocol layer may optionally implement EPC signaling layer security features. The Packet Data Convergence Sublayer (PDCP- TS 36. 323 ) protocol layer may optionally implement user data security features. For public safety LTE networks, these optional security layer feature specified in 3GPP TS 33.401 should be implemented.”

## **Interference Coordination**

36. There are numerous techniques to mitigate intercell interference in LTE networks. Semi-Static Inter Cell Interference Coordination (ICIC) rather than Static ICIC is more efficient since it takes into account the transmission power and traffic load on different resource blocks in neighboring sites. However, this would require interconnection between neighboring eNodeBs. Fractional Power Control (FPC) is another technique that can be used in the uplink to suppress Intercell Interference (ICI). LTE Advanced will introduce Co-ordinated Multi-Point transmission / reception (CoMP) that can further improve cell edge performance through ICI mitigation.

## **Incumbent Narrowband Operation**

37. Although there are no incumbent narrowband operations within the 700MHz. public safety broadband spectrum within the State of New York, we nevertheless concur with the Commission position as expressed in the *Waiver Order* requiring broadband network operators to protect narrowband incumbents through appropriate engineering measures or geographic exclusion, or to relocate them at their own expense. However, we wish to emphasize that narrowband licensees should not be permitted to indefinitely delay the deployment of the Public Safety nationwide broadband network within their coverage area simply by refusing to cooperate with the public safety broadband licensee in their effort to resolve interference issues that may exist.

## **B. Public Safety Roaming on Public Safety Broadband Networks**

38. In response to the Commission's inquiry regarding *nomenclature* as discussed in paragraph 87; we concur with the Commission's tentative definition of a public safety roamer as "A mobile station receiving service from a station or system in the public safety broadband network other than one to which it is a subscriber." In addition, we concur with the Commission's definition of the three broad categories of public safety roamers listed below<sup>35</sup>:

- ***"Itinerant roamers*** - *Those on a network while in transit through an area or while in the execution of a small scale task (such as an extradition or conference attendance.)"*
- ***"Interoperability Roamers*** – *Those who are on the network as part of a long standing arrangement."*
- ***"Response Roamers*** – *Those who are on the network as part of a coordinated response to a large scale emergency incident"*

39. We concur with the Commission's tentative conclusion that all public safety users should be able to roam onto all other 700MHz. public safety regional broadband networks, and that all public safety 700MHz. network operators should have an obligation to enter into roaming agreements with other public safety broadband providers on reasonable terms and conditions. We concur with the Commission's tentative conclusion that enabling public safety users to roam on multiple public safety broadband networks is an important step on the path to a nationwide interoperable public safety network and that establishing an obligation for technologically

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<sup>35</sup> See *Fourth Further Notice of Proposed Rulemaking* ¶ 87.

compatible networks to allow for intra-system roaming will provide public safety with increased interoperability.

### **C. Federal Use**

#### **Roaming by Federal Users**

40. Federal users roaming onto regional public safety broadband networks should be granted access; however, the priority level should be governed by the regional network operator. Federal users should be exempted from network charges when they are acting in the role of a Response Roamer as defined above, responding to a disaster or emergency. However, they should be subject to network charges when using the network in a non-emergency role or while performing routine duties. Revenues collected by regional operators in this fashion should be used to defray network operational costs. Ultimately, the costs to operate and maintain any wireless network are borne by the users of the network. Consequently, regional public safety networks should be made available to as many eligible users as possible without impinging upon the ability of first responders to perform their mission. Priority access and Quality of Service mechanisms should be implemented to assure that sufficient capacity margins are maintained to accommodate first responder needs. Extending network availability to Federal users helps achieve this goal.

### **D. Testing and Verification to Ensure Interoperability**

#### **Conformance Testing**

41. It is likely that several vendors will propose multiple user devices for use on the public safety regional broadband networks. Since these devices must operate on all public safety broadband networks, the NYPD suggests that interoperability and protocol conformance testing be performed on all user devices and network components prior to being certified for field



deployment. We suggest that wireless industry labs or other third party labs be certified to perform this function. This procedure can serve as a preliminary filter for user devices, potentially reducing the number of user devices requiring subsequent Interoperability Testing at a designated IOT test lab.

### **Interoperability Testing**

42. By their very nature, LTE networks are far more complex than existing public safety wireless communications networks based on land mobile radio technology. In order to ensure nationwide interoperability across several regional LTE networks, the NYPD supports the creation of one or more laboratory facilities dedicated to perform public safety Interoperability Testing (IOT). Although it is not necessary for every regional public safety network to be identical, they must all be interoperable. Consequently, we believe that it is critical for public safety network operators to have access to a certified IOT laboratory that can serve the various regional public safety networks. Commercial nationwide wireless network operators maintain in-house labs that are kept busy testing new devices, new software versions, software upgrades, and patches (bug fixes) on a continuous basis. The public safety nationwide broadband network, although technically a “network of networks” must operate in a similar manner in order to ensure nationwide interoperability.

### **E. Other Matters Relevant to Interoperability on Public Safety Broadband Networks**

#### **Network Operations, Administration and Maintenance**

43. As we have stressed throughout these Reply Comments, we believe that a nationwide network consisting of interconnected regional networks is the appropriate model. The vast

majority of public safety incidents are local or regional in nature. Local and regional public safety personnel are the best qualified individuals to ascertain the needs in their jurisdiction, One size does not fit all, and top down approach will not achieve the desired results. In particular, we believe that local control is essential in the following five critical areas.

- Prioritization
- Device Implementation
- Provisioning
- Account Management and Local Billing
- RAN Site Maintenance (scheduled and unscheduled)

### **In Building Communications**

44. The NYPD is particularly concerned with in building coverage due to the great number of large buildings within our jurisdiction. We concur with the Commission’s statement articulated in the Fourth Further Notice of Proposed rulemaking: “We anticipate that in the future public safety agencies will come to rely on broadband technologies for mission critical services including voice services.”<sup>36</sup> Accordingly, we concur that an RF margin should be incorporated into the basic design to compensate for in building attenuation effects as is presently done in narrowband voice systems. Since geography, building size, building height, building density and construction techniques vary greatly throughout the region and the nation, a “one size fits all” approach is inappropriate. We believe that the following levels as proposed in the *Third Further Notice of Proposed Rulemaking*, cited below are appropriate.<sup>37</sup>

- Dense Urban 22dB

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<sup>36</sup> See *Fourth Further Notice of Proposed Rulemaking*; ¶ 124.

<sup>37</sup> See *Third Further Notice of Proposed Rulemaking*, Appendix C, Proposed Rules, page 183, Table 3.

- Urban 19dB
- Suburban 13dB
- Rural 6dB
- Highway 6dB

### **Deployable Assets**

45. Deployable assets such as cell sites on wheels (COWs) and cell sites on light trucks (COLTs) should be considered a critical component of the nationwide cellular style public safety broadband wireless network that, in spite of our best efforts, may be subject to localized outages especially during natural disasters or other extreme circumstances. Deployable assets may also be required during major public safety incidents to provide additional capacity or enhance coverage. Future releases of the LTE Standards (Release 10) will provide for the use of Relay Stations which will enhance cell edge performance and be particularly beneficial in rural LTE network deployments where wired backhaul may be cost prohibitive.

### **Operation of Fixed Stations and Complementary use of Fixed Broadband Spectrum**

46. There are many instances where the use of fixed stations within the public safety broadband wireless network is appropriate. The use of wired fixed stations supporting mobile operations, such as a dispatch operation is a key element for public safety operations; the use of wireless fixed stations (similar to control stations in the land mobile radio environment); the deployment of Femto cells as a means to achieve or improve in building coverage particularly in urban areas; the use of LTE Relays to extend coverage, particularly in rural areas and to enhance cell edge performance throughout the network.

47. Public safety network planners and operators should be cognizant of the propagation characteristics of the 700MHz. spectrum and the 4.9GHz. spectrum and use these characteristics to complement each other. A public safety agency may choose to establish 4.9GHz. hotspots at police precincts and firehouses, enabling officers to download large non mission critical data files such as software updates without impacting the capacity of the 700MHz. broadband macro network. Wherever possible, public safety agencies should utilize the 4.9GHz. band rather than 700MHz. for video transmissions from fixed locations such as permanent video surveillance installations, exploiting the greater bandwidth and throughput characteristics of 4.9GHz., while reserving the 700MHz. network capacity for connectivity with mobile and portable units.

#### **Compliance with the Commission's Environmental Regulations**

48. We assume that the vast majority of 700MHz. Public Safety Broadband Network Radio Access Node (RAN) installations will be co-located with existing public safety or commercial radio sites that are in compliance with the Commission's environmental regulations. New radio sites (towers) should comply with the existing FCC rules, including the Commission's environmental regulations.

#### **F. Section 337 Eligible Users**

49. In order to maintain financial viability and improve spectrum utilization, public safety licensees should be allowed to seek network users among closely related agencies and industries if there is sufficient capacity on their networks after the needs of first responders are met. Once again, local control is a key element and one size does not fit all. It is entirely possible that in New York City there will be a sufficient number of public safety eligible users who fit the

Commission's narrow interpretation of Section 337 to populate the network to a sustainable level. However, in many areas of the country this will not be the case. Accordingly, we urge the Commission to broaden its interpretation of Section 337 to include all government entities, local, county, State, Tribal and Federal. In addition, critical infrastructure providers such as utility companies would be an appropriate fit<sup>38</sup>. Many emergency situations such as natural disasters require public safety agencies to work closely with utility companies to restore service in the aftermath of hurricanes, forest fires, earthquakes, snowstorms or floods. We concur with comments filed by the State of New Mexico<sup>39</sup> that the Commission has the legal authority to allow public safety operators to share spectrum with Critical Infrastructure entities.

#### **IV CONCLUSION**

50. For the reasons stated herein, the New York City Police Department urges the Commission to adapt rules and policies consistent with the views expressed in these Reply Comments.

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<sup>38</sup> See *National Broadband Plan, Chapter 16, Public Safety*; page 315-316; *Administrative System* "Public safety licensees should also be able to allow non-public safety partners to use their spectrum on a secondary basis – that can be preempted- through leasing or similar mechanisms. Partners could include critical infrastructure users such as utilities connecting to the Smart Grid. However, any revenue collected by a public safety entity for such use must be used to build or improve the public safety broadband network."

<sup>39</sup> See *Comments of the State of New Mexico*, page 9 at b. "In addition to the general delegation of broad rulemaking authority [granted] to the Commission, under ¶ 337 (a), the statute in ¶ 337 (f) (1), also specifically contemplates use of the spectrum by "non-governmental entities" for critical communications of a public safety nature, based on authorization from a government entity whose primary mission is the protection of life, health or property."

Respectfully Submitted,

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